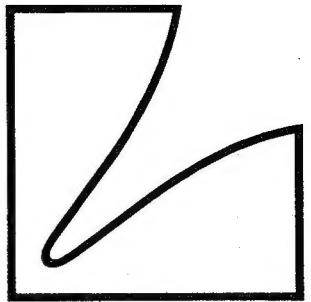
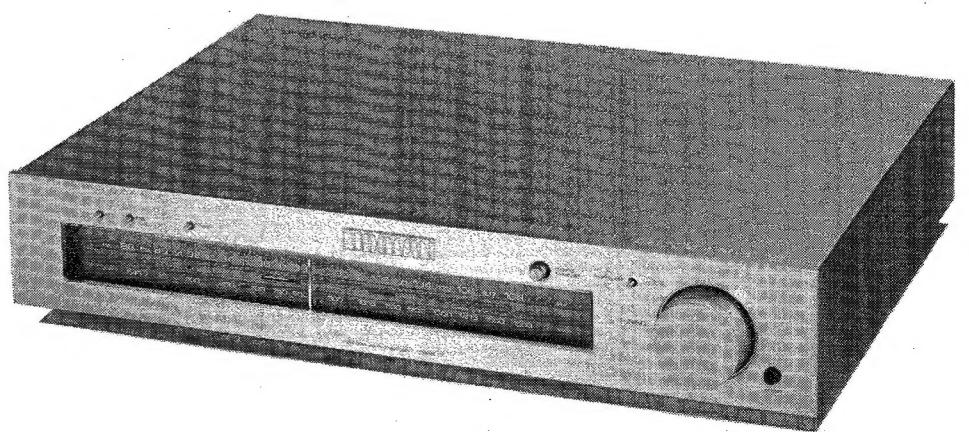


SERVICE MANUAL



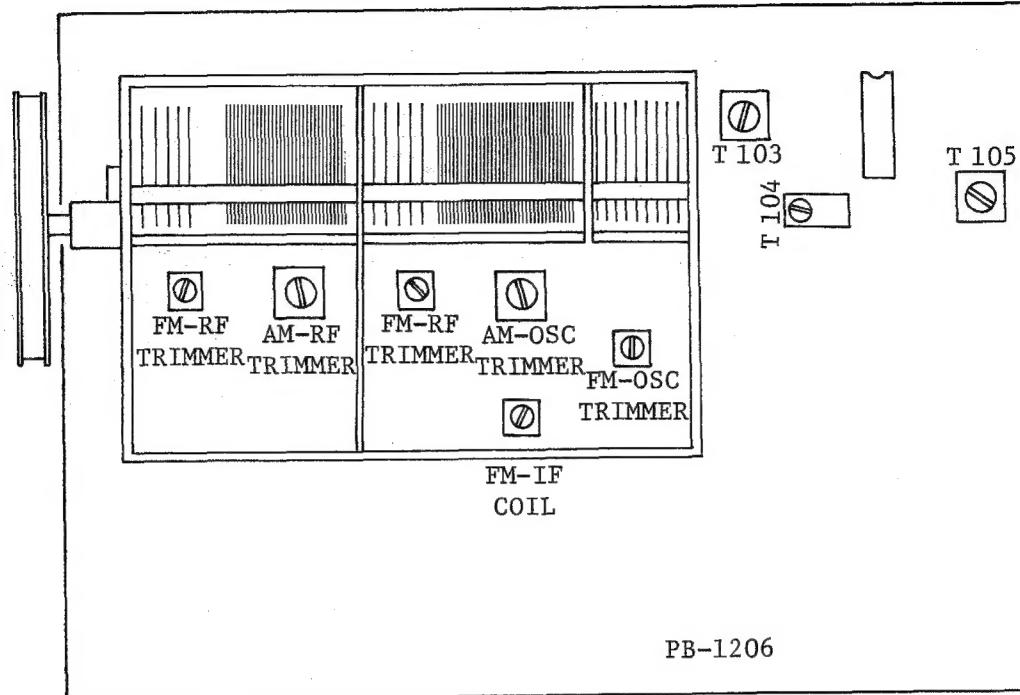
SOLID STATE AM/FM
STEREO TUNER

T-2



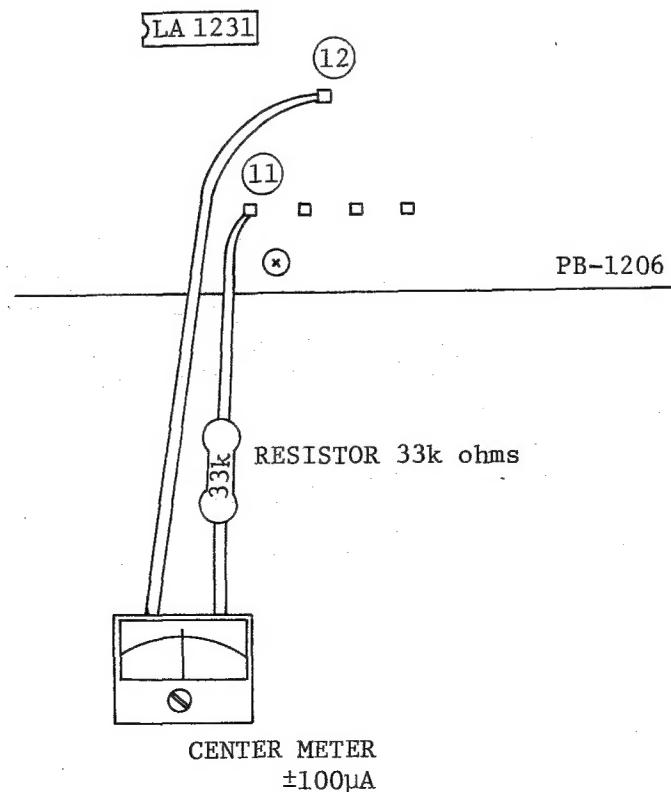
ALIGNMENT PROCEDURE

[Location of Trimmer Capacitors and Coils]



Step Process

1. Set the VR101 to the endmost clockwise position.
2. Set the VR104, VR105 VR106 at the center.
3. Connect a resistor 33K ohms in series to the center meter ($\pm 100MA$), and connect it to the terminals (11) and (12) of the PB1206.



4. Set each switch on the front panel in the following manner.
 - a) the AM-FM selector switch to FM (depressed)
 - b) the FM-MONO switch to "auto stereo" (protruded)
 - c) the muting switch to "off" (depressed)
 - d) the muting volume to the endmost counter-clockwise position
5. Connect the measurement instruments in the following manner.
 - a) Connect the tuner output terminal on the back panel with the milli-volt meter, distortion meter and oscilloscope.
 - b) Connect the output of FM SG to the 300 ohms terminal through the matching network.

- FRONT-END-

6. Reduce the output of FM SG to minimum.
7. Set the tuner at interstation position, and adjust the core of the T101 to obtain the " ± 0 " indication at the center meter.
8. Tune in to 108MHz (Place the dial pointer at 108MHz).
9. Set FM SG at 108MHz, and obtain the output of 2uV with "400Hz, 100%" modulation.
10. Adjust the FM oscillator trimmer at front-end to receive the signals from FM SG at the center of the center tuning meter.
11. Adjust the RF trimmer and inter-stage trimmer to obtain the max. sensitivity of tuner. (See to it that the output is maximum and that distortion is minimum.)
12. Set FM SG at 87.5MHz and obtain the output of 2uV.
13. Turn the dial knob to receive the signals from FM SG at the center of the center meter.
14. Confirm that the dial calibration error in step (13) is within the width of the dial pointer.
If the error is found beyond allowance, shift the dial pointer and repeat the steps (8) - (14).
15. Set the tuner and FM SG at the middle position of the dial scale having no broadcast station.
16. Adjust the core of front-end IFT to obtain the max. output of the tuner.
17. Set FM SG to provide "1KHz, 100%" modulation.
18. Adjust the core of the T102 to obtain the minimum distortion at the tuner's output.

19. Reduce the FM SG output to the minimum level.
20. Adjust the core of the T101 to obtain the ± 0 indication of the center meter.
21. Repeat the steps (17) - (20) 2 or 3 times so that the distortion can be suppressed down to the specified level with the center meter at the center position.
22. Set the output of FM SG at 10uV.
23. Set the output of FM SG at 10uV.
24. Vary the FM SG output and confirm that all LED's light up and put off in order.
25. Set the output of FM SG at 100uV.
- 25-B Confirm that the operational bandwidth of the center tuning LED is about $\pm 10\text{KHz}$ during the tuning operation and that it becomes about $\pm 50\text{KHz}$ in 10 sec. after center tuning is completed.
26. Turn the tuning knob, and confirm that the center position of the center meter accords to the point where 2 center tuning LED's light up. Also confirm that they light up one after another.
27. Turn in to the position where 2 center tuning LED's light up, and confirm that they are kept lit within the variation of the FM SG output from 10uV to 10mV.
28. Set the output of FM SG to 100uV.
29. Turn on the muting switch. (protruded)
30. Confirm that the muting functions in the vicinity of $\pm 30\text{KHz}$ while turning the tuning knob.
31. Fix the dial pointer at the point where 2 center LED's light up.
32. Vary the FM SG output, and confirm that the signals are available at about 6uV.
33. Set the muting volume on the front panel to the dead clockwise position.
34. Vary the FM SG output, and confirm that the signals are available at about 300uV.
35. Remove the connection of the center meter made in the step (3)
- STEREO -
36. Set the FM SG output at 1mV with no modulation.
37. Connect a frequency counter to the terminal No. 70 and GND point on PB1206.

38. Adjust the VR104 to read 76KHz $^{+0}_{-10}$ Hz on the frequency counter.
39. Remove the connection of the frequency counter at the step (37).
40. Set FM SG into stereo modulation (19KHz pilot signal 10%, 1KHz L+R 90%)
41. Adjust the VR105 to obtain the max. separation with proper balance between L and R.
42. Check the stereo distortion, and confirm it below the specified level.
43. Confirm that monaural reception is possible with depressing the MONO Switch on the front panel.
44. Also Confirm that all rated specs are satisfied.

- European "S" type unit requires following additional steps -

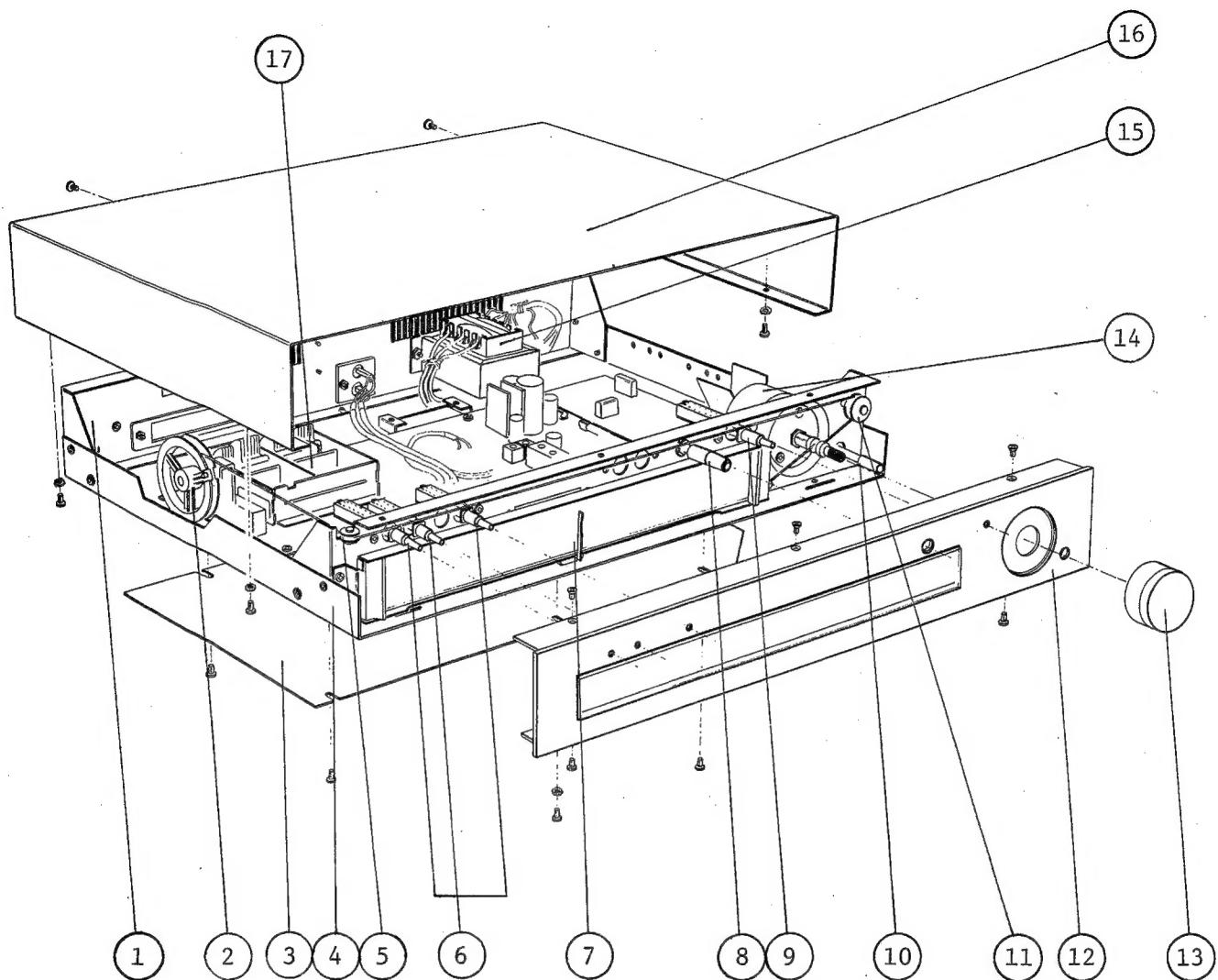
- A) Set FM SG to the center position of the dial scale having no broadcast station, and provide 1mV output with "1KHz, 100%" modulation.
- B) Connect a milli-volt meter to the No. 15 terminal and GND point of the PB1206.
- C) Set the indication of the milli-volt meter to 0dB.
- D) Set the modulation frequency to 60KHz, and confirm that the indication of the milli-volt meter is within -0.5dB.
- E) Change the modulation frequency to 70KHz, and confirm that the milli-volt meter's indication exceeds -11dB.

[AM Section]

45. Set the AM-FM switch to AM position.
46. Connect the output of 455KHz Sweep Generator (SPG) to the No. 64 terminal and GND position of the PB1206.
47. Connect the SPG input to the No. 69 terminal and GND.
48. Set SPG to "output 40-50dB, sweep speed 10Hz".
49. Adjust the T104 and T105 so that the IF wave-form can be symmetrical and that the output can be maximum. At this time, it is easy to observe the wave-form if the AM tuning capacitor is set at the least capacitive position.
50. Disconnect the SPG.
51. Connect the output of AM SG to the specified loop-stick antenna.
52. Set the frequency of the AM SG at 1,400KHz, output 50dB/m, modulation 400Hz, 30R.
53. Tune into 1,400KHz on the dial scale, and adjust the trimmer of AM-Oscillator to receive the signals from AM SG.

54. Adjust the AM RF trimmer to obtain the max. output of tuner.
55. Set the AM SG frequency to 600KHz, output 50dB/m, modulation 400Hz, 30%.
56. Turn the tuning knob to tune in at 600KHz on dial.
57. Adjust the core of the T103 to receive the signals from AM SG.
58. Adjust the core of the bar antenna to obtain the max. output of tuner.
59. Repeat the steps (52) - (58) 2 or 3 times, and confirm that the dial calibration error is within the limit of specs.
60. Set AM SG to "1MHz, 80dB/m output".
61. Adjust the VR106 so that 3 LED's should light up.
62. Confirm that all AM specs are satisfied.

EXPLODED VIEW



1. UC1121	Rear Panel (E,S)	10. WJ1089	Mould Knob
UC1129	" " (U)	11. BX7017	Pulley
2. BX1006	Dial Drum	12. WA1183	Panel
3. UE1097	Bottom Plate	13. WH1082	Knob Set
4. UA1052	Chassis	14. UX1009	Fly Wheel
5. BX0029	Pulley 13 m/m	15. PT2301	Power Trans. (U)
6. WJ1107	Mould Knob	PT2302(A)	" " (S)
7. UZ1163	Dial Pointer	PT2344	" " (E)
8. WH1083	Knob Set	16. UG1017	Bonnet (U)
9. WJ1107	Mould Knob	UG1018	" (E,S)
		17. LA1909	Front End

Replacement Parts List

REMARKS

Capacitors: C.....ceramic, E.....electrolytic, M.....mylar, G.....G capacitor
 S.....styrol, T.....tantalum, Mi....mica, MP....MP capacitor
 O.....oil capacitor, TRIM.....trimmer capacitor, AC....AC capacitor
 BP....electrolytic Bi-Polar type

Resistors: 5%, 1/4W, unless specified otherwise

Type: (S)...model for north European countries
 (U)...model for U.S.A. and CANADA

(E)...standard model
 (J)...model for JAPAN

PB1206A

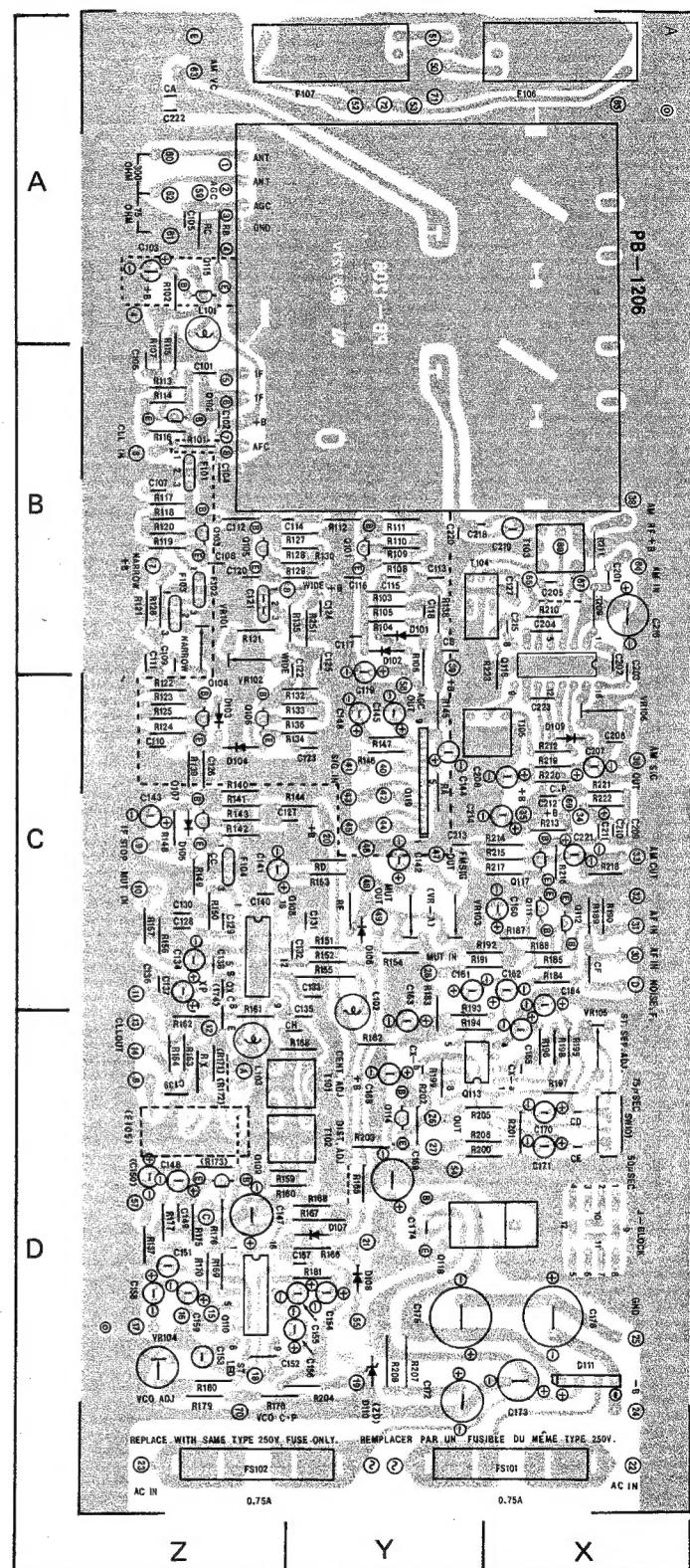
SYMBOL NO.	STOCK NO.	DESCRIPTIONS		SYMBOL NO.	STOCK NO.	DESCRIPTIONS	
R107	RB0158	R-25	100	R180	RB0210	R-25	15k
113	0174	"	470	181	0182	"	1k
114	0200	"	5.6k	182	0222	"	47k
115	0154	"	68	183	0222	"	47k
116	0170	"	330	184	0194	"	3.3k
117	0174	"	470	185	0194	"	3.3k
118	0192	"	2.7k	186	0182	"	1k
119	0168	"	270	187	0206	"	10k
120	0170	"	330	188	0206	"	10k
121	0158	"	100	189	0194	"	3.3k
126	0158	"	100	190	0194	"	3.3k
R137	RB0210	"	15k	191	0206	"	10k
140	0198	"	4.7k	192	0222	"	47k
141	0224	"	56k	193	0230	"	100k
142	0154	"	68	194	0230	"	100k
143	0170	"	330	195	0190	"	2.2k
144	0158	"	100	196	0190	"	2.2k
R148	RB0218	"	33k	197	0198	"	4.7k
149	0218	"	33k	198	0218	"	33k
150	0174	"	470	199	0218	"	33k
151	0158	"	100	200	0206	"	10k
152	0158	"	100	201	0206	"	10k
153	0206	"	10k	202	0222	"	47k
154	0222	"	47k	203	0134	"	10
155	0142	"	22	204	0184	"	1.2k
156	0224	"	56k	205	0142	"	22
157	0214	"	22k	206	0142	"	22
158	0204	"	8.2k	207	RD0260	R-50	270
159	0188	"	1.8k	208	RD0051	R1/4	270
160	0214	"	22k	209	RB0134	R-25	10
161	0166	"	220	210	0186	"	1.5k
162	0214	"	22k	211	0166	"	220
163	0214	"	22k	212	0170	R-25	330
164	0214	"	22k	213	0158	"	100
165	0222	"	47k	214	0234	"	150k
166	0206	"	10k	215	0184	"	1.2k
167	0150	"	47	216	0216	"	27k
168	0174	"	470	217	0164	"	180
169	0194	"	3.3k	218	0198	"	4.7k
170	0194	"	3.3k	219	0206	"	10k
171	---			220	0206	"	10k
172	RB0206	R-25	10k	221	0192	"	2.7k
173	0206	"	10k	222	0216	"	27k
174	0174	"	470	223	0200	"	5.6k
175	---			RB	RB0216	R-25	27k
176	0150	"	47	RC	0210	"	15k
177	0210	"	15k	---	0206	"	10k
178	0206	"	10k	---	0182	"	1k
179	0230	"	100k	Jumper	RG0030	JPW-03	

SYMBOL NO.	STOCK NO.	DESCRIPTIONS	
C101	CK0155	0.01 μ F	C
102	0158	0.047 μ F	C
103	---		
104	---		
105	CK0158	0.047 μ F	C
106	0158	"	C
107	0158	"	C
108	0158	"	C
109	---		
110	---		
111	CK0158	0.047 μ F	C
126	CK0156	0.022 μ F	C
127	CK0158	0.047 μ F	C
128	0158	"	C
129	0158	"	C
130	0158	"	C
131	0158	"	C
132	0158	"	C
133	0158	"	C
134	CE0099	2.2 μ F 50V	E
135	CK0158	0.047 μ F	C
136	0158	"	C
137	CE0213	0.47 μ F 50V	E
138	CC0007	100pF	C
139	CK0158	0.047 μ F	C
140	---		
141	CK0158	0.047 μ F	C
142	---		
143	CE0099	2.2 μ F	E
144	---		
145	---		
146	---		
147	CE0079	220 μ F 25V	E
148	0075	22 μ F 16V	E
149	CC0011	470 μ F	C
150	CE0075	22 μ F 16V	E
151	CQ0170	470pF	S
152	CQ0009	0.047 μ F	M
153	CQ0170	470pF	S
154	CE0168	3.3 μ F 50V	E
155	0098	1 μ F 50V	E
156	CS0445	0.22 μ F 35V	T
157	CK0155	0.01 μ F	C
158	CE0099	2.2 μ F 50V	E
159	CE0099	2.2 μ F 50V	E
160	CE0098	1 μ F 50V	E
161	CS0445	0.22 μ F 35V	T
162	0445	0.22 μ F 35V	T
163	CE0084	4.7 μ F 25V	E
164	CE0075	22 μ F 16V	E
165	0075	22 μ F 16V	E
166	CQ0265	2200pF	S
167	CQ0265	2200pF	S
168	CE0075	22 μ F 16V	E
169	CE0079	220 μ F 16V	E
170	0084	4.7 μ F 25V	E
171	0084	4.7 μ F 25V	E
172	CE0087	220 μ F 25V	E
173	0079	220 μ F 16V	E
174	CK0155	0.01 μ F	C
175	CE0090	1000 μ F 25V	E
176	0090	1000 μ F 25V	E

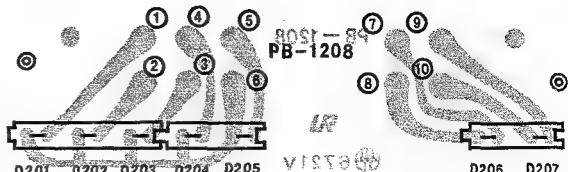
SYMBOL NO.	STOCK NO.	DESCRIPTIONS	
C201	CK0156	0.022 μ F	C
202	CK0158	0.047 μ F	C
203	0158	0.047 μ F	C
204	0156	0.022 μ F	C
205	0156	0.022 μ F	C
206	0158	0.047 μ F	C
207	CE0074	10 μ F 16V	E
208	0168	3.3 μ F 50V	E
209	CQ0168	0.018 μ F	M
210	0024	1500pF	M
211	0157	0.018 μ F	M
212	CK0155	0.01 μ F	C
213	0158	0.047 μ F	C
214	CE0074	10 μ F 16V	E
215	CK0156	0.022 μ F	C
216	CE0079	220 μ F 16V	E
217	CK0158	0.047 μ F	C
218	CC0004	22pF	C
219	CQ0172	330pF	S
220	CC0013	15pF	C
221	CE0084	4.7 μ F 25V	E
223	CK0126	1000pF	C
Cx	CQ0218	750pF	S
Q101	---		
102	TR0233	2SC535	B
103	TR0019	2SC1923	O
104	---		
105	---		
106	---		
107	TR0019	2SC1923	O
108	TC0099	LA1231 FM	IC
109	TR0174	2SC1345 [TO-92]	
110	TC0100	μ PC1173C MPX	IC
111	TR0198	2SC1815	GR
112	TR0198	2SC1815	GR
113	---		
114	TR0198	2SC1815	GR
115	---		
116	TC0021	HA1197 AM	IC
117	TR0198	2SC1815	GR
118	TR0047	2SD235	Y
Q301	TC5002	NJM4558D	IC
D105	TD0116	1S2075	Diode
106	TV0004	KB-265	Varister
107	TD0116	1S2075	Diode
108	TD0116	1S2075	Diode
109	TV0004	KB-265	Varister
110	TD0079	WZ-140	Zener
111	TD0144	SVB10-100	Diode
VR101	RT0054	300	ohms
102	---		
103	RT0052	20k	ohms
104	RT0025	4.7k	[B]
105	RT0085	100k	ohms
106	RT0056	50k	ohms

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
T101	LA1147	LUX1147 FM Trans
102	LA1148	LUX1148 "
103	LA1073	LUX1073 AM OSC Coil
104	LA1098	FSN-1067 "
105	LA1100	LA-1100 "
L101	LA1143	S-470K Choke Coil
102	LA1149	S-180J "
103	LA1149	S-180J "
F101	LA1829	
102	LA1829	FM Ceramic Filter Kit
104	LA1829	
105	LA1192	Anti Birdie Filter [S]
106	LA1191	Low Pass Filter "
107	LA1191	
FS101	BF0085	Fuse 0.75A [E] [U]
102	BF0207	Fuse 5x20 630mA [S]

PB1206A



SYMBOL NO.	STOCK NO.	DESCRIPTION
	TD0149	LED LD-002R
	TD0150	LED LD-003R



PB1235

SYMBOL NO.	STOCK NO.	DESCRIPTIONS	
R301	RD0100	R-50	2.2M
302	RB0184	R-25	1.2k
303	0184	"	1.2k
304	0206	"	10k
305	0206	"	10k
306	0242	"	330k
307	0242	"	330k
308	RD0134	R-50	470
309	RB0206	R-25	10k
310	0206	"	10k
311	"	"	"
312	"	"	"
313	"	"	"
314	"	"	"
315	RB0222	R-25	47k
316	"	"	"
317	0158	"	100
318	0162	"	150
319	0206	"	10k
320	0206	"	10k
321	0222	"	47k
322	0206	"	10k
323	0222	"	47k
324	0222	"	"
325	0214	"	22k
326	0222	"	47k
327	"	"	"
328	"	"	"
329	"	"	"
330	RB0152	"	56
331	0198	"	4.7k
332	0184	"	4.7k
333	0206	"	10k
334	0250	"	680k
335	0214	"	22k
336	0198	"	4.7k
337	0250	"	680
338	0218	"	33k
339	0250	"	680k
340	0174	"	470
R341	RB0174	R-25	470
342	0174	"	470
343	RB0206	"	10k
344	0206	"	10k
345	0222	"	47k
346			
347	RB0198	R-25	4.7k
348	0150	"	47
349	RS0206	"	10k
350	RB0206	"	10k
351	0222	"	47k
352	0206	"	10k
353	0198	"	4.7k

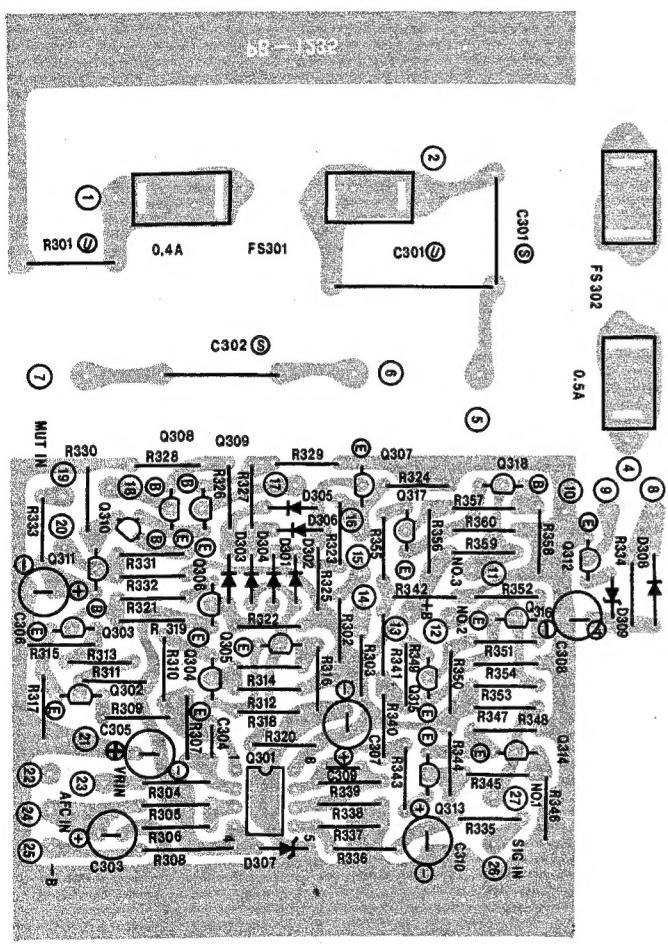
SYMBOL NO.	STOCK NO.	DESCRIPTION
354	0150	" 47
355	0206	" 10k
356	0206	" 10k
357	0222	" 47k
358	0206	" 10k
359	0198	" 4.7k
360	0142	" 22
C301	CU0006	AC Capacitor 0.022 μ F[E]
	CU0065	AC Capacitor 0.022 μ F[U]
	CU0033	AC Capacitor 0.022 μ F[S]
302	CU0006	AC Capacitor 0.022 μ F[E]
	CU0033	AC Capacitor 0.022 μ F[S]
303	CE0213	0.47 μ F 50V E
304	CK0126	1000pF C
305	CE0074	10 μ F 16V E
306	CE0098	1 μ F 50V E
307	CE0074	10 μ F 16V E
308	CE0075	22 μ F 16V E
309	CK0126	1000pF C
310	CE0099	2.2 μ F 50V E
Q301	TC5002	NJM4558D IC
302	TR0087	2SA1015 Y
303	TR0087	2SA1015 Y
304	TR0230	2SC458 BC
308	TR0230	2SC458 BC
309	TR0230	"
310	TR0230	"
311	TR0230	"
312	TR0174	2SC1345 [TO-92]
313	TR0230	2SC458 BC
314	TR0230	"
315	TR0230	"
316	TR0230	"
317	TR0230	"
318	TR0230	"
D301	TD0116	1S2075 Diode
302	TD0116	"
303	TD0116	"
304	TD0116	"
305	TD0116	"
306	TD0116	"
307	TD0164	HZ12 C-3 14V
		Zener
308	TD0018	1K188FM-1
309	TD0159	HZ9 C-1 9V
		Zener

REAR PANEL

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
F301 302	BF0072	Fuse 0.3A [EK] [EZ]
	BF0216	Fuse 5x20 125mAT [S]
	BF0073	Fuse 0.4A [U]
	BF0074	Fuse 0.5A [U]
	BF0074	Fuse 0.5A [E]
	AH0003	Fuse Holder [E] [U]
	AH0004	Fuse Holder [S]

SYMBOL NO.	STOCK NO.	DESCRIPTIONS
	AT0013	2P Pin Jack
	AT0053	SP Terminal
	BX0027	Antenna Holder
	LA1146	Loopstick Antenna
	PT2301	Power Transformer[U]
	PT2302A	Power Transformer[S]
	PT2344	Power Transformer[E]
	UC1121	Rear Panel [E] [S]
	UC1129	Rear Panel [U]

SUB PANEL



CHASSIS

STOCK NO.	DESCRIPTIONS
AC0013	AC Selector Socket (E)
AC0014	AC Selector Plug (E)
BX0016	Dial Drum
BX0038	Dial Spring
LA1052	Balun
SP0113	Push Sw. (power) (U)
SP0114	Push Sw. (") (E)(S)
UA1052	Chassis
UZ1163	Dial Pointer
WN0007	Leg T-C
UE1097	Bottom Plate
UG1017	Bonnet (U)
UG1018	Bonnet (E)(S)
WA1183	Front Panel
WH1082	Knob Set (tuning)
WH1083	Knob Set (muting threshold)
WJ1089	Mould Knob (power)
WJ1107	Mould Knob (AM, FM, mono, muting)

PB1237 [MW/LW CONVERTER PCB] [T-2L only]

SYMBOL NO.	STOCK NO.	DESCRIPTIONS	
R401	RB0204	R-25	8.2K
402	0218	"	33k
403	0192	"	2.7k
404	0150	"	47
405	0134	"	10
406	0204	"	8.2k
407	0222	"	47k
408	0192	"	2.7k
409	0150	"	47
410	0134	"	10
411	0226	"	68k
	SP0119	Push Sw. (LW/MW)	
C401	---		
402	---		
403	CK0156	0.022μF	C
404	CK0156	0.022μF	C
405	CC0013	15pF	C
406	CQ0172	330pF	S
407	CC0012	10pF	C
408	CK0156	0.022μF	C
409	CC0004	22pF	C
410	CQ0205	15pF	S
411	CC0006	47pF	C
412	---		
413	CK0156	0.022μF	C
417	CC0006	47pF	C
---	CC0082	27pF	C
Q401	TR0233	2SC535	B
402	TR0233	2SC535	B
D403	TD0018	1K188FM-1	
TC401	CT0008	Trimmer	
		Condenser	
402	CT0008	Trimmer	
		Condenser	
403	CT0008	Trimmer	
		Condenser	
404	CT0008	Trimmer	
		Condenser	
T401	LA1073	AM OSC Coil	
402	1095	LW OSC Coil	
L401	LA1176	Choke Coil	
402	LA1176	Choke Coil	
R126	RB0155	R-25	10k
201	0156	R-25	22k
204	0156	R-25	22k
205	0156	R-25	22k
215	0156	R-25	22k

SYMBOL NO.	STOCK NO.	DESCRIPTION
D110	TD0164	HZ12 C-3 14V Zener
	LA1117	Loopstick Antenna for AM
	WM1048	Dial Scale
	WA1184	Front Panel
	WJ1107	Mould Knob (FM, AM, MW/LW, muting/mono)
	LA1910	Front End
	UC1106	Rear Panel

SPECIFICATIONS

< FM Section >

Receiving Frequency:	87.5MHz – 108MHz	
50dB Quieting Sensitivity:	75 μ sec. 14.8dBf (3.0 μ V), 50 μ sec. 15.5dBf (3.3 μ V)	
IHF Usable Sensitivity:	10.8dBf (1.9 μ V)	
Signal to Noise Ratio:	75dB	
Frequency Response:	30 – 15kHz (within \pm 1dB)	
Total Harmonic Distortion	(mono)	(stereo)
100Hz:	0.15%	0.3%
1kHz:	0.15%	0.3%
6kHz:	0.3%	0.5%
Capture Ratio:	1.5dB	
Adjacent Channel Selectivity:	10dB (\pm 200kHz)	
Alternate Channel Selectivity:	75dB (\pm 400kHz)	
Spurious Response Ratio:	80dB	
IF Response Ratio:	80dB	
Image Response Ratio:	55dB	
AM Suppression Ratio:	55dB	
Stereo Separation:	44dB (100Hz), 48dB (1kHz) 38dB (10kHz), 38dB (1kHz, European type with optional birdie filter)	
Subcarrier Product Ratio:	65dB	
SCA Rejection Ratio:	60dB	
Output Voltage:	1V	
Output Impedance:	100 ohms	
Muting Threshold:	10 μ V – 300 μ V	
< AM Section >	(MW)	(LW for the T-2L)
IHF Usable Sensitivity:	250 μ V/m	500 μ V/m
Image Ratio:	50dB (45dB for the T-2L)	32dB
IF Rejection Ratio at 1MHz:	40dB	24dB
Signal to Noise Ratio:	50dB	50dB
Total Harmonic Distortion:	0.6%	0.6%
Output Voltage 30% mod.:	0.3V	0.3V
Power Requirement:	10W	
Additional Features:	Center Indicator, Signal Strength Indicator, FM Muting Switch, FM Muting Level Control	
Dimensions:	438(W) x 331(D) x 84(H)mm (17-1/4" x 13-1/32" x 3-5/16") (including legs, rear protrusions and knobs.)	
Weight:	Net: 5.8kgs (12.8 lbs.)	Gross: 7.3kgs (16.1 lbs.)

Specifications and appearance design subject to change without notice.

